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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,516	04/19/2004	Matti Floman	915-007.087	4302

4955 7590 06/29/2007  
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EXAMINER
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CAMPOS, YAIMA

ART UNIT	PAPER NUMBER
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2185

MAIL DATE	DELIVERY MODE
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06/29/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/828,516	FLOMAN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Yaima Campos	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 April 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 24-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                 | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 2185

### **DETAILED ACTION**

1. The instant application having Application No. 10/828,516 has a total of 23 claims pending in the application; there are 4 independent claims and 19 dependent claims, all of which are ready for examination by the examiner.

#### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 2, 2007 has been entered.

### **SPECIFICATION**

3. The amendments to the Specification filed on April 2, 2007 have been entered.

### **REJECTIONS BASED ON PRIOR ART**

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 24, 28-43 and 45** are rejected under 35 U.S.C. 103(a) as being unpatentable by Camacho et al. (US 6,167,487) in view of Ware et al. (US 6,826,657).
6. As per **claims 24, 41-42 and 45**, Camacho discloses a memory unit comprising: “a first processor in communication with a memory unit, and a second processor in communication with the memory unit” ”. [**“multi-port RAM that allows read and write accesses from different ports to be performed simultaneously” (Col. 1, lines 54-56)**] at least two memory areas for storing data, [**“a cache SRAM memory and a main DRAM memory arranged on the chip” (Col. 2, lines 10-19; Figure 1 and related text)**] at least two memory areas for storing data, [**“a cache SRAM memory and a main DRAM memory arranged on the chip” (Col. 2, lines 10-19; Figure 1 and related text)**] first terminals for accessing data within the memory areas, second terminals for accessing data within the memory areas, and [**“single chip having first and second input/output pins” (Col. 2, lines 10-19; 28-45) “ports A and B” (Figure 1 and relate text)**] at least two access controllers for selectively providing [**“the first data path may be controlled independently of the second data path” (Col. 2, lines 20-22) “port A control 22” and “port B control 24” (Figure 1 and related text)**] sole addressing and accessing data through one of the terminals, or [**“the first and second data path may be arranged so as to provide a single port for input/output of a data combination to or from the cache memory” (Col. 2, lines 46-52)**] individual addressing and accessing data through each of the terminals, respectively, [**“the first and second data paths may be arranged to provide input/output of data**

Art Unit: 2185

**burst to or form the cache memory independently of each other” (Col. 2, lines 54-61)]**

wherein in case of sole addressing and accessing the data the access controllers provide access to the memory areas by control ports and address ports of only one of the terminals [**“each of the ports A and B have address and control pins for receiving external address and control signals. The address and control signals for port A are independent from the address and control signals for port B” (Col. 5, lines 51-62) “data pins 18 and 20 for supporting the output of the 16-bit data signals DQA and DQB for ports A and B” (Col. 6, lines 32-54) “A and B enables a user to combine them into a single 32-bit port. A unified-port mode of operation may be defined by a pre-set control signal supplied via an external pin... in the unified-port mode of operation, an external memory controller provides joint control of corresponding external control and address signals supplied to port A and port B control circuits 22 and 24 so as to perform a single 32-bit write or read access to the SRAM 16 via the both ports... further, if one port of the MPRAM 10 is disabled, the MPRAM 10 would be fully functional via the other port. In particular, any one of ports A and B enables read and write accesses to each and every location in the SRAM 16” (Col. 7, lines 33-56)]**.

Camacho does not disclose expressly wherein in the case of sole addressing, and data is provided through data ports of both terminals.

Ware discloses a multi-port memory having two access modes (individual and sole) in which in case of sole addressing and accessing the data the access controllers provide access to the memory areas by control ports and address ports of only one of the

Art Unit: 2185

terminals and provides the data through data ports of both terminals as [address ports A and data ports QDy and QDx wherein “first memory module 160 is connected to both the first port (Port 1a) 154 and the second port (Port 1b) 156 of the memory controller 152 through the QDx data bus and the QDy data bus” having half of the storage locations accessible through port 1a and half accessible through port 1b (Col. 15, line 47-Col. 16, line 13) “in the first memory module 160 are operated in the first mode with half of the storage location in the memory components (MEM) 174 accessible through the QDx data bus and the other half of the storage locations in the memory component (MEM) 174 accessible through the QDy data bus. It should be noted, however, that the memory components (MEM) 174 in the first memory module 160 may also be operated in the second mode with all of the storage locations accessible through the QDx data bus and the QDy data bus is unused” (Col. 15m lines 13-46) “FIG. 6B has the second memory module 172 connected to the third port (Port 2) 158 of the memory controller 152 through the QDx data bus. Thus, the memory components (MEM) 174 in the second memory module 172 are operated in the second mode with all of the storage locations accessible through the QDx data bus, and the QDy data bust is unused” (Figures 6A-6B and related text) “the type of access mode (i.e., either lockstep or independent) will depend upon both the source of a memory request (i.e, either the graphics processor or the main central processing unit) and/or the address of the memory request (lockstep region or independent region). The mode selection can be accomplished by a programmable register, fuse, jumper, etc. in the memory controller 352” (Col. 32, lines 16-23) (Col. 7, lines 6-25)].

Art Unit: 2185

Camacho et al. (US 6,167,487) and Ware et al. (US 6,826,657) are analogous art because they are from the same field of endeavor of computer memory access and control.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the memory unit as disclosed by Camacho and further provide of sole addressing and accessing the data the access controllers provide access to the memory areas by control ports and address ports of only one of the terminals and provides the data through data ports of both terminals as disclosed by Ware.

The motivation for doing so would have been because Ware discloses sole addressing and accessing the data the access controllers provide access to the memory areas by control ports and address ports of only one of the terminals and provides the data through data ports of both terminals is done as [**“These solutions provide maximum memory bandwidth across the full memory address space when the memory system is constrained to a single memory module per memory controller port, and the memory modules are allowed to have different densities and organizations. These solutions also keep memory bandwidth (and other performance metrics) as balanced as possible across the entire memory space”** (Col. 32, line 66-Col. 33, line 6)].

Therefore, it would have been obvious to combine Camacho et al. (US 6,167,487) with Ware et al. (US 6,826,657) for the benefit of creating a memory unit to obtain the invention as specified in claims 24, 41-42 and 45.

7. As per **claim 28**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein the first and/or second terminal comprises control ports for

receiving control signals for controlling access to the memory areas [**“each of the ports A and B have address and control pins for receiving external address and control signals. The address and control signals for port A are independent from the address and control signals for port B;”** control ports “SCA” and “SCB” (Col. 5, lines 51-62; Figure 1 and related text)].

8. As per claim 29, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein the first and/or second terminal comprises address ports for receiving addressing signals for addressing data within the memory areas [**“each of the ports A and B have address and control pins for receiving external address and control signals. The address and control signals for port A are independent from the address and control signals for port B;”** address ports “ADA” and “ADB” (Col. 5, lines 51-62; Figure 1 and related text)].

9. As per claim 30, the combination of Camacho and Ware discloses the memory unit of claim 29, wherein the address ports provide access to an external address bus [**“each of the ports A and B have address and control pins for receiving external address and control signals. The address and control signals for port A are independent from the address and control signals for port B”** (Col. 5, lines 51-62; Figure 1 and related text)].

10. As per claim 31, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein the first and/or second terminal comprises data ports for reading and/or writing data to and/or from the memory areas [**“data pins 18 and 20 for supporting the output of the 16-bit data signals DQA and DQB for ports A and B”** (Col. 6, lines 32-54; Figure 1 and related text)].



Art Unit: 2185

11. A per **claims 32-33**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein the access controllers provide access to the data areas based on control and/or address signals at said terminals wherein the access controllers are state machines, the state machines providing access to the data areas based on states of signals at the first and second terminals. [**“SRAM control signals SCA and SCB for the ports A and B, respectively, are supplied via a port A control circuit 22 and a port B control circuit 24 to define SRAM operations such as data read or write, and burst termination” (Col. 3, lines 47-56) “each of the ports A and B comprises a pipelined data path having pipeline stage 1 and pipeline stage 2. The pipeline stages 1 include decoding circuits 110A and 110B, address latches 112A and 112B, and main amplifiers 114A and 114B for ports A and B, respectively... a deselect signal may be supplied to each of the decoding circuits 110A and 110B to inhibit the ports from accepting commands. For example, the deselect signal may be produced when the chip select signal /SS is set to a predetermined state” (Col. 6, lines 15-41; Figure 4 and related text)**].

12. As per **claim 34**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein the access controllers comprise memory registers [**“write per bit mask registers 34 and 36” (Col. 4, lines 34-51) “data transfer registers 44” (Col. 5, lines 6-21) “mode register” (Col. 5, lines 22-37)**].

13. As per **claims 35-36**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein the access controllers provide access to at least one memory area by the control ports and the address ports of the terminals, respectively, and provides the data through the data ports of the terminals, respectively, in case of

individual addressing wherein the access controllers provide access to at least one memory area by both of the control ports and the address ports of the terminals, and provide the data through the data ports of the terminals, respectively, in case of individual addressing [**“a set mode register command SMR issued by the DRAM control circuit 42 enables the burst length and type to be programmed in an internal mode register. Ports A and B may be programmed individually so as to allow port A to read or write data burst of one length, whereas port B is enabled to read or write data burst of another length... one port may be programmed to support sequential addressing of data bursts, whereas the other port may be programmed to provide interleave addressing... each port has its own independent burst length counter, burst termination logic and memory addressing logic. Therefore, the burst mode operations for port A may be carried out independently of burst mode operations for port B” (Col. 7, line 57-Col. 8, line 31)**].

14. As per **claim 37**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein at least two memory areas are provided [**“a cache SRAM memory and a main DRAM memory arranged on the chip” (Col. 2, lines 10-19; Figure 1 and related text)**].

15. As per **claim 38**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein programming the size of the memory areas is provided through one of the terminals [**“each port has its own independent burst length counter, burst termination logic and memory addressing logic. Therefore, the burst mode operations for port A may be carried out independently of burst mode operations for port B” (Col. 8, lines 27-31)**].

16. As per **claim 39**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein one of the terminals provides accessing the data by a central processing unit, and wherein one of the terminals provides accessing the data by a graphics processor [**“a multi-port RAM that allows read and write accesses from different ports to be performed simultaneously”** (Col. 1, lines 65-67; Col. 1, lines 13-60)].

17. As per **claim 40**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein the bandwidth and/or clocking frequency for the terminals is different [**“Ports A and B may be programmed individually so as to allow port A to read or write data burst of one length, whereas port B is enabled to read or write data burst of another length”** (Col. 7, line 57-Col. 8, line 31)].

18. As per **claim 43**, the combination of Camacho and Ware discloses a module for providing memory to processors, comprising connection terminals providing communication between an electronic circuit and a memory unit according to claim 24 [**busses (Figure 1 and related text)**].

19. As per **claim 25**, the combination of Camacho and Ware discloses the memory unit of claim 24, wherein a memory area provides access by the control ports and the address ports of both of the terminals, respectively, and the data through the data ports of both of the terminals, respectively [**“a set mode register command SMR issued by the DRAM control circuit 42 enables the burst length and type to be programmed in an internal mode register. Ports A and B may be programmed individually so as to allow port A to read or write data burst of one length, whereas port B is enabled to read or write data burst of another length... one port may be programmed to**

Art Unit: 2185

support sequential addressing of data bursts, whereas the other port may be programmed to provide interleave addressing... each port has its own independent burst length counter, burst termination logic and memory addressing logic.

Therefore, the burst mode operations for port A may be carried out independently of burst mode operations for port B” (Col. 7, line 57-Col. 8, line 31)]

wherein a third memory area a memory area provides access by the control ports and the address ports of both of the terminals, respectively, and the data through the data ports of both of the terminals [Ware discloses this limitation (Figure 13C and related text)].

20. As per claim 26, the combination of Camacho and Ware discloses the memory unit of claim 25, wherein two of the three memory areas provide access by the control ports and the address ports of the terminals, respectively, and the data through the data ports of the terminals, respectively [The same rationale in the rejection to claims 35-36 is herein incorporated].

21. As per claim 27, the combination of Camacho and Ware discloses the memory unit of claim 25, wherein the access controllers provide prioritized access to the third memory area through one of the terminals [Camacho discloses this limitation as “chip select signals /SD and /SS provide chip select functions for the DRAM 12 and the SRAM 16, respectively” (Col. 3, lines 62-64) wherein “if one port of the MRAM 10 is disabled, the MRAM 10 would be fully functional via the other port. In particular, any one of ports A and B enables read and write accesses to each and every location in the SRAM 16” (Col. 7, lines 52-56) Ware discloses this limitation (Col. 15, line 13-Col. 16, line 13)].

22. As per **claim 46**, the combination of Camacho and Ware discloses the memory unit of claim 45, wherein a memory area provides access by the control ports and the address ports of both of the terminals, respectively, and the data through the data ports of both of the terminals, respectively [**“a set mode register command SMR issued by the DRAM control circuit 42 enables the burst length and type to be programmed in an internal mode register. Ports A and B may be programmed individually so as to allow port A to read or write data burst of one length, whereas port B is enabled to read or write data burst of another length... one port may be programmed to support sequential addressing of data bursts, whereas the other port may be programmed to provide interleave addressing... each port has its own independent burst length counter, burst termination logic and memory addressing logic. Therefore, the burst mode operations for port A may be carried out independently of burst mode operations for port B” (Col. 7, line 57-Col. 8, line 31)**]  
three memory areas in a memory unit wherein a third memory area a memory area provides access by the control ports and the address ports of both of the terminals, respectively, and the data through the data ports of both of the terminals, respectively as [**Ware discloses this limitation (Figure 13C and related text)**].

23. **Claim 44** is rejected under 35 U.S.C. 103(a) as being unpatentable over Camacho et al. (US 6,167,487) and Ware et al. (US 6,826,657) as applied to claim 24 above and further in view of below

24. It is noted that the combination of Camacho and Ware does not disclose a mobile communication device comprising a memory unit according to claim 24. However, the examiner asserts that it would have been obvious to one ordinary skill in the art at the

Art Unit: 2185

time the invention was made to use the memory as being claimed in claim 24 in a mobile communication device. A recitation directed to the manner in which a claim is intended to be used does not distinguish the claim from the prior art if prior art has the capability to do so (See MPEP 2114 and Ex Parte Masham, 2 USPQ2d 1647 (1987)).

### **ACKNOWLEDGMENT OF ISSUES RAISED BY THE APPLICANT**

#### **Response to Amendment**

25. Applicant's arguments filed April 2, 2007 have been fully but are moot in view of new grounds of rejection.

### **RELEVANT ART CITED BY THE EXAMINER**

26. The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.

27. The following reference teaches a memory system in which either the local CPU can access the memory banks or an external device can access the memory banks, one exclusive of the other.

### **U.S. PATENT NUMBER**

US 5,996,051

Art Unit: 2185

**CLOSING COMMENTS**

**Examiner's Note**

28. Examiner has cited particular columns and line numbers in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

**Conclusion**

**a. STATUS OF CLAIMS IN THE APPLICATION**

29. The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. 707.07(i):

**a(1) CLAIMS REJECTED IN THE APPLICATION**

30. Per the instant office action, claims 24-46 have received a first action on the merits and are subject of a first action non-final.

**a(2) CLAIMS NO LONGER UNDER CONSIDERATION**

31. Claims 1-23 stand cancelled as of amendment received on April 2, 2007.

**b. DIRECTION OF FUTURE CORRESPONDENCES**

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yaima Campos whose telephone number is (571) 272-1232. The examiner can normally be reached on Monday to Friday 8:30 AM to 5:00 PM.

Art Unit: 2185

**IMPORTANT NOTE**

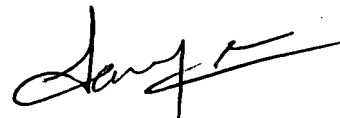
33. If attempts to reach the above noted Examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Sanjiv Shah, can be reached at the following telephone number: Area Code (571) 272-4098.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 14, 2007



Yaima Campos  
Examiner  
Art Unit 2185



SANJIV SHAH  
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